THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 25

UNITED STATES PATENT AND TRADEMARK OFFICE

_____

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

_____

Ex parte TRAVIS E. BARNES,
and BRIAN E. UHLENHAKE

_____

Appeal No. 1999-0276
Application 08/283,099

_____

ON BRIEF

_____

Before CALVERT, COHEN and CRAWFORD, Administrative Patent Judges.

CALVERT, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1 to 6, all the claims in the application.

The subject matter in issue is defined by independent

claim 1 as:

1. A method for electronically controlling the timing of fuel injection to start an internal combustion engine (55), comprising the steps of:

sensing the temperature of the engine (55) and producing a temperature signal (T_c) indicative of the sensed engine temperature;

sensing the engine speed and producing an engine speed signal (S_f) indicative of a magnitude of the sensed engine speed; and

receiving the engine speed and temperature signals, determining the start of injection to cause combustion at substantially Top Dead Center (TDC) based on the magnitude of the engine speed and temperature, and producing a timing angle signal (2) representing when fuel is to be injected relative to (TDC), wherein the magnitude of the timing angle signal (2) includes a predetermined ignition delay from the time that fuel is injected to the start of combustion.

The text of the appealed claims is set forth in Appendix A of appellants' brief.

The references applied in the final rejection are:

Tsai	4,463,733	Aug. 7, 1984
Igashira et al. (Igashira)	4,722,310	Feb. 2, 1988
Barnes et al. (Barnes)	5,357,912	Oct. 25, 1994
	(filed Feb. 26, 1993)	

Claims 1 to 6 stand finally rejected under 35 U.S.C. § 103(a) as follows:

(1) Claims 1 to 3, unpatentable over Igashira in view of Barnes;

(2) Claim 4, unpatentable over Igashira in view of Tsai[1];

(3) Claims 5 and 6, unpatentable over Igashira in view of Tsai, further in view of Barnes.

First considering the rejection of claim 1, the examiner's position as stated on pages 2 and 3 of the final rejection (Paper No. 15) is, in essence, that it would have been obvious to modify the Igashira injection system to correct the injection timing based on engine temperature, asserting that the indirect sensing of viscosity disclosed by Barnes at col. 4, lines 31 to 33,

> is the use of engine temperature, since engine temperature and its relationship to fuel temperature, and thus fuel viscosity, is well known in the art. Also, coolant temperature <u>is</u> clearly identified in Barnes as an input into fuel quantity calculations, and the quantity is used to set injection timing (column 4, lines 28-54).

The examiner further argues on pages 4 and 5 of the answer

---

[1] Since claim 4 is dependent on claim 1, it seems incongruous for the examiner not to have included Barnes in the rejection of claim 4. However, in the view we take of this case, this incongruity is of no consequence.

that:

> It remains the examiner's position that this indirect sensing of viscosity would have been obvious to achieve using engine temperature. Furthermore, it is extremely well known in the diesel injection art to advance timing as engine temperatures decrease. For the applicant to assert that it is not known to advance timing as engine temperatures are lowered makes no sense. Combustion, particularly in a diesel engine always takes longer at lower engine temperatures and this is particularly true at starting. Igashira (column 1, lines 1-58) clearly teaches using timing data to first determine a desired timing for injection and then correcting any errors using the actual ignition data. This is a refinement of the known systems which all consider engine temperature.

Initially, we find nothing in the Barnes patent to support the examiner's statement, supra, that "coolant temperature is clearly identified in Barnes as an input into fuel quantity calculations." Barnes does not mention sensing coolant temperature or engine temperature, and in fact, does not expressly disclose sensing any temperature in the entire specification. The only express disclosure of sensing any temperature in Barnes is the recitation of means for sensing ambient temperature and of an ambient temperature signal (Ta) in claims 9 and 10, and an arrow labelled "Ta" in Fig. 1.

With regard to the examiner's assertion, quoted above,

that it would have been obvious, in view of Barnes' disclosure of indirectly sensing actuating fluid viscosity, to sense engine temperature, appellants disagree (e.g., on page 12 of their brief), and the examiner has cited no evidence in support of his

assertion. He also has not cited any evidence in support of his statement that "the known systems . . . all consider engine temperature." It is fundamental that a rejection under § 103 must rest on a factual basis, which the PTO has the duty of supplying. The PTO may not, because it may doubt the invention is patentable, resort to speculation, unfounded assumptions or hindsight reconstruction to supply deficiencies in its factual basis. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968), quoted in In re GPAC, Inc., 57 F.3d 1573, 1582, 35 USPQ2d 1116, 1123 (Fed. Cir. 1995). Here, the examiner has cited Igashira and Barnes as evidence of obviousness in rejecting claim 1, but we find no factual basis in those references to support the conclusion that the step of sensing the temperature of the engine and producing a temperature signal indicative of the sensed engine temperature, as recited in the claim, would have been obvious to one of ordinary skill in the art; any such conclusion would appear to be based on improper hindsight, derived from appellants' own disclosure.

Accordingly, we will not sustain the rejection of claim

1.

The rejection of dependent claims 2 to 6 likewise will not be

sustained; as to claims 4 to 6, the additional reference, Tsai, does not supply the above-discussed evidence which is lacking in Igashira and Barnes.

Conclusion

The examiner's decision to reject claims 1 to 6 is reversed.

REVERSED

IAN A. CALVERT Administrative Patent Judge	)	
IRWIN CHARLES COHEN Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
MURRIEL E. CRAWFORD	)	

Administrative Patent Judge)

David M. Masterson
Caterpillar Inc.
Patent Dept. AB6490
100 N E Adams Street
Peoria, IL 61629-6490

IAC/dal